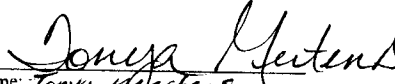


IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. 10/566,334 **Group Art Unit:** 1792
Applicant(s): Anand Chellappa et al. **Examiner:** Padgett, Marianne L.
Filing Date: 2/9/2007 **Docket No.** 37929-32401
Title: Methods for providing thin hydrogen separation membranes and associated uses **Customer No.** 84651

CERTIFICATE UNDER 37 CFR 1.6(d)

I hereby certify that this document is being transmitted electronically to the United States Patent and Trademark Office via the EFS Web e-Filing system on 12/31/2010


Name: Tonya R. Hartens

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450


I, Anand Chellappa, do hereby state and declare as follows:

1. I am one of the inventors of the above-identified application, and thus, I am familiar with the application and the invention claimed therein.
2. I graduated in 1997 from the University of Missouri-Columbia with a Ph.D. degree in Chemical Engineering.
3. I have been working in the field of catalysts, chemical reactors and chemical engineering since about 1989 and have spent about 14 years in Research and Technology Development. I am currently a Vice President at Intelligent Energy, Inc.
4. I am an inventor/co-inventor of seven issued U.S. patents. I have co-authored about 10 technical papers in this field and have given over 20 speeches on the subject.

5. I have read U.S. Pat. No. 6,152,987 ("*Ma*"); U.S. Pat. No. 6,214,090 ("*Dye*"); and U.S. Pat. No. 5,738,708 ("*Peachey*") cited as prior art in the Office Action of December 16, 2010.
6. *Ma* discloses a method for fabricating a hydrogen gas-extraction membrane including reacting a porous metal substrate with an oxidizing agent to form a ceramic intermediate layer on a surface of the porous metal substrate. (*Ma*, Abstract). The ceramic intermediate layer is an oxidized layer. (*Ma*, col. 8, lines 9-10). According to *Ma*, the oxidized intermediate layer could increase the hydrogen permeability of the composite membrane as well as fracture toughness and ductility of the substrate. (*Ma*, col. 2, lines 46-58).
7. In contrast, *Dye* and *Peachey* disclose ion milling for the purpose of removing oxidation. (*Dye*, col. 3, lines 30-33; *Peachey*, col. 2, lines 25-32). As such, applying the ion milling techniques of *Dye* and *Peachey* to the product of *Ma* would cancel the benefits of the oxidized intermediate layer of *Ma*.
8. One of ordinary skill in the art would have understood the disclosure of *Ma* to teach away from ion milling techniques such as those of *Dye* and *Peachey*.
9. I have read U.S. Pat. Pub. No. 2001/0016236 ("*Hu*"), cited as prior art in the Office Action of December 16, 2010.
10. *Hu* discloses methods for contacting liquid suspensions containing metal precursors with light for causing the reductive precipitation of the metal precursors to metal complexes. (claim 1, paragraph [0005]). The suspension is provided above the surface of a solid or semisolid substrate. The liquid is then removed by heat or vacuum to yield a film on the substrate that is partly comprised of the metal from the PSI-metal complexes.
11. One of ordinary skill in the art would not have understood this disclosure of *Hu* to disclose a laser direct-write process. Rather, *Hu* discloses reductive precipitation.
12. *Hu* relies upon reduction of a suspension containing metal precursors. The process of *Hu* does not operate on metallic ink including a metallic component, even if metals are among the resultant products disclosed in *Hu*.
13. One of ordinary skill in the art would not have understood the disclosure of *Hu* to utilize a metallic ink having a metallic component. Rather, *Hu* utilizes metal precursors.

14. I declare further that all statements made herein of my own knowledge are true; that all statements made herein on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patents issuing thereon.

Executed this 31 day of December, 2010, at Albuquerque, NM.



Anand Chellappa